

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Please amend claims 1, 7, and 13, and add new claims 17-25 as follows:

1. (Currently amended) A semiconductor device comprising:

~~a circuit substrate and a semiconductor substrate fixed with respect to said circuit substrate;~~

said a semiconductor substrate including a fixed portion, and a movable portion, and connecting members for elastically connecting said movable portion to said fixed portion on a plane, said semiconductor substrate having grooves between said fixed portion and said movable portion except at said connecting members, said movable portion being movable in a predetermined direction with respect to said fixed portion, said fixed portion having electrical insulation from said movable portion and including:

an input electrode for inputting a periodical signal from said an external circuit substrate to said movable portion to vibrate said movable portion; and

an output electrode for outputting a signal indicative of capacitive variation based on vibration of said movable portion in said predetermined direction ~~toward said circuit substrate;~~

an input wire for connecting said input electrode to said external circuit substrate;

an output wire for connecting said output electrode to said external circuit substrate;

a shield wire connected to a constant potential at said external circuit substrate to provide capacitive shielding between said input wire and said output wire; and

a pad connected to said shield wire on said fixed portion at a location other than said input electrode and said output electrode between said input electrode and said output electrode to place said shield wire between said input wire and output wire having electrical insulation and to supply said constant potential to said fixed portion.

2. (Original) The semiconductor device as claimed in claim 1, wherein a top surface of said semiconductor substrate has a rectangular shape, and said input electrode and said output electrode are arranged at locations corresponding to different sides of said rectangular shape, respectively.

3. (Original) The semiconductor device as claimed in claim 1, wherein said shield wire is grounded at said circuit substrate.

4. (Previously Presented) The semiconductor device as claimed in claim 1, wherein said shield wire is arranged adjacent to either of said input electrode or said output electrode.

5. (Previously Presented) The semiconductor device as claimed in claim 1, wherein said fixed portion further includes a dummy electrode adjacent to said output electrode and capacitively coupled to said input electrode for generating a dummy signal and

a dummy signal wire is connected to said dummy electrode and said circuit substrate, said dummy signal including an induced component of said periodical signal and being supplied to said circuit substrate to be used to cancel another component of said periodical signal induced in said periodical signal.

6. (Previously Presented) The semiconductor device as claimed in claim 1, wherein said movable portion is movable in another predetermined direction with respect to said fixed portion, said semiconductor device further comprising angular velocity detection means for detecting vibration of said movable portion in said another direction to determine an angular velocity around an axis perpendicular to said predetermined direction and another predetermined direction to generate said detection signal.

7. (Currently Amended) A semiconductor device comprising:

~~a circuit substrate and a semiconductor substrate fixed with respect to said circuit substrate;~~

said a semiconductor substrate including a fixed portion, and a movable portion, and connecting members for elastically connecting said movable portion to said fixed portion on a plane, said semiconductor substrate having grooves between said fixed portion and said movable portion except at said connecting members, said movable portion being movable in a predetermined direction with respect to said fixed portion, said fixed portion having electrical insulation from said movable portion and including:

an input electrode for inputting a periodical signal from said an external circuit substrate to said movable portion to vibrate said movable portion;

an output electrode for outputting a signal indicative of capacitive variation based on vibration of said movable portion in said predetermined direction ~~toward said circuit substrate;~~ and

a monitor electrode for monitoring capacitive variation based on vibration

of said movable portion in said first predetermined direction and supplying a monitor signal to said external circuit substrate;

an input wire for connecting said input electrode to said external circuit substrate;

an output wire for connecting said output electrode to said external circuit substrate;

a monitor wire for connecting said monitor electrode to said external circuit substrate;

a shield wire connected to a constant potential at said external circuit substrate to provide capacitive shielding between said input wire and said output wire and between said input wire and said monitor wire; and

a pad connected to said shield wire on said fixed portion at a location other than said input electrode and said output electrode between said input electrode and said output electrode to place said shield wire between said input wire and output wire and between said input wire and said monitor wire having electrical insulation and to supply said constant potential to said fixed portion.

8. (Original) The semiconductor device as claimed in claim 7, wherein said semiconductor plate is a rectangular plate, and said input electrode and said output electrode are arranged at locations corresponding to different sides of said rectangular plate, respectively.

9. (Original) The semiconductor device as claimed in claim 7, wherein said shield wire is grounded at said circuit substrate.

10. (Previously Presented) The semiconductor device as claimed in claim 7, wherein said shield wire is arranged adjacent to either of said input wire or said output wire.

11. (Previously Presented) The semiconductor device as claimed in claim 7, wherein said shield wire is arranged adjacent to either of said input wire or said monitor wire.

12. (Previously Presented) The semiconductor device as claimed in claim 7, wherein
said fixed portion further includes a dummy electrode adjacent to said output electrode and capacitively coupled to said input electrode for generating a dummy signal, and

a dummy signal wire is connected to said dummy electrode and said circuit substrate, said dummy signal including an induced component of said periodical signal and being supplied to said circuit substrate to be used to cancel another component of said periodical signal induced in said periodical signal.

13. (Currently amended) A semiconductor device comprising:

~~a circuit substrate and a semiconductor substrate fixed with respect to said circuit substrate;~~

said a semiconductor substrate including, on a plane, a fixed portion, and a movable portion, said fixed portion ~~being fixed with respect to said circuit substrate and~~ having elastically supporting means for supporting said movable portion ~~with~~ to allow movement in a predetermined direction with respect to said fixed portion, said movable

portion being electrically connected to a predetermined potential;

capacitive driving means for driving said movable portion, said capacitive driving means including a drive electrode included in said fixed portion for inputting a drive signal from said an external circuit substrate to said movable portion to vibrate said movable portion;

detection means for detecting capacitive variation based on vibration of said movable portion caused by supplying said drive signal to said movable portion, said detection means including a detection electrode included in said fixed portion to supply a detection signal to said external circuit substrate; and

a shield wire pad arranged between said drive electrode and said detection electrode ~~which is neighbor to~~ neighboring said drive electrode;

a drive signal wire for connecting said drive electrode to said external circuit substrate;

a detection wire for connecting said detection electrode to said external circuit substrate; and

a shield wire connected to said shield wire pad and a constant potential at said external circuit substrate to provide capacitive shielding between said drive signal wire and said detection wire and to supply said constant potential to said fixed portion.

14. (Previously Presented) The semiconductor device as claimed in claim 1, wherein said pad is arranged on said fixed portion to have predetermined distances to said input electrode and said output electrode to provide spatial distances for said capacitive shielding between said input wire and said output wire by said shield wire connected to

said pad.

15. (Previously Presented) The semiconductor device as claimed in claim 7, wherein said pad is arranged on said fixed portion to have predetermined distances to said input electrode and said output electrode to provide spatial distances for said capacitive shielding between said input wire and said output wire by said shield wire connected to said pad.

16. (Previously Presented) The semiconductor device as claimed in claim 13, wherein said shield pad is arranged on said fixed portion to have predetermined distances to said drive electrode and said detection electrode to provide spatial distances for said capacitive shielding between said drive signal wire and said detection wire by said shield wire connected to said shield wire pad.

17. (New) A semiconductor device comprising:

a semiconductor substrate including a fixed portion, a movable portion, and connecting members for elastically connecting said movable portion to said fixed portion, said semiconductor substrate having grooves between said fixed portion and said movable portion except said connecting members, said fixed portion being coplanar with said movable portion across said grooves and said connecting members throughout said grooves and said connecting members, said movable portion being movable in predetermined first and second directions with respect to said fixed portion, said fixed portion having electrical insulation from said movable portion and including:

an input electrode for inputting a periodical signal from an external circuit substrate to said movable portion to vibrate said movable portion; and

an output electrode for outputting a signal indicative of capacitive variation based on vibration of said movable portion in said predetermined direction toward said external circuit substrate;

an input wire for connecting said input electrode to said external circuit substrate;

an output wire for connecting said output electrode to said external circuit substrate;

a shield wire connected to a constant potential at said external circuit substrate to provide capacitive shielding between said input wire and said output wire; and

a pad connected to said shield wire on said fixed portion at a location other than said input electrode and said output electrode between said input electrode and said output electrode to place said shield wire between said input wire and output wire having electrical insulation and to supply said constant potential to said fixed portion.

18. (New) The semiconductor device as claimed in claim 17, wherein said connecting members includes driving beams allowing said movable portion to move in said first predetermined direction and detection beams allowing said movable portion to move in said second predetermined direction.

19. (New) The semiconductor device as claimed in claim 18, wherein said driving beams each have a bar shape and said detection beams each have a U shape.

20. (New) A semiconductor device comprising:

a semiconductor substrate including, on a plane, a fixed portion and a movable portion, said fixed portion being fixed with respect to an external circuit substrate and having supporting means for supporting said movable portion with movement in a predetermined direction with respect to said fixed portion, said movable portion being electrically connected to a predetermined potential;

capacitive driving means for driving said movable portion, said capacitive driving means including a drive electrode included in said fixed portion for inputting a drive signal from said external circuit substrate to said movable portion to vibrate said movable portion;

detection means for detecting capacitive variation based on vibration of said movable portion caused by supplying said drive signal to said movable portion, said detection means including a detection electrode included in said fixed portion to supply a detection signal to said external circuit substrate;

a shield wire pad arranged between said drive electrode and said detection electrode that is adjacent to said drive electrode;

a drive signal wire for connecting said drive electrode to said external circuit substrate;

a detection wire for connecting said detection electrode to said external circuit substrate; and

a shield wire connected to said shield wire pad and a constant potential at said external circuit substrate to provide capacitive shielding between said drive signal wire

and said detection wire and to supply said constant potential to said fixed portion.

21. (New) The semiconductor device as claimed in claim 20, wherein said connecting members includes driving beams allowing said movable portion to move in said first predetermined direction and detection beams allowing said movable portion to move in said second predetermined direction.

22. (New) The semiconductor device as claimed in claim 20, wherein said driving beams each have a bar shape and said detection beams each have a U shape.

23. (New) A semiconductor device comprising:

a semiconductor substrate including, on a plane, a fixed portion and a movable portion, said fixed portion being fixed with respect to an external circuit substrate and having elastically supporting means for supporting said movable portion to allow movement in a predetermined direction with respect to said fixed portion, said movable portion being electrically connected to a predetermined potential;

capacitive driving means for driving said movable portion, said capacitive driving means including a drive electrode included in said fixed portion for inputting a drive signal from said external circuit substrate to said movable portion to vibrate said movable portion;

detection means for detecting capacitive variation based on vibration of said movable portion caused by supplying said drive signal to said movable portion, said detection means including a detection electrode included in said fixed portion to supply a

detection signal to said external circuit substrate;

a shield wire pad arranged between said drive electrode and said detection electrode neighboring said drive electrode;

a drive signal wire for connecting said drive electrode to said external circuit substrate;

a detection wire for connecting said detection electrode to said external circuit substrate; and

a shield wire connected to said shield wire pad and a constant potential at said external circuit substrate to provide capacitive shielding between said drive signal wire and said detection wire and to supply said constant potential to said fixed portion.

24. (New) The semiconductor device as claimed in claim 23, wherein said connecting members includes driving beams allowing said movable portion to move in said first predetermined direction and detection beams allowing said movable portion to move in said second predetermined direction.

25. (New) The semiconductor device as claimed in claim 23, wherein said driving beams each have a bar shape and said detection beams each have a U shape.